

REMARKS

Claims 1-25 are pending in the application. Claims 1, 4, 5, 13, 15, 17, and 19 are amended, and claims 2 and 3 are canceled, the subject matter thereof being incorporated into independent claim 1. (The amendments to claims 4, 5, 13, 15, 17, and 19 are to revise claim dependencies accordingly.) Applicants request reconsideration and allowance in view of the above amendments and the following remarks.

Specification Objection The specification is objected to because the text refers to “gray water” whereas the figures refer to “grey water.” The text has been amended to refer to “grey water.” The objection is overcome.

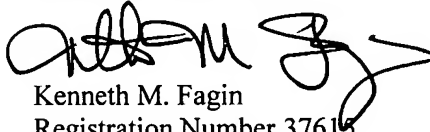
Claim Rejections Claims 1-5, 7-12, 15, 17, and 18 are rejected as allegedly being anticipated by Walton, U.S. Patent Number 3,132,096. Claims 13, 14, and 19-25 are rejected as allegedly being obvious based on Walton in view of Max, U.S. Publication Number 2002/0003111 A1 (relied on for its disclosure of in-land-shaft-based hydrate desalination and pre-treatment of the water to be purified without causing hydrate to form therein). Claim 6 is objected to as being dependent on a rejected base claim but is otherwise indicated to be directed to allowable subject matter. (The Examiner neglected to address claim 16.) Applicants respectfully submit that Walton neither anticipates nor renders obvious the claimed invention, either by itself or in combination with any other reference.

According to the invention, a natural or automatic circulatory system is established within the upper regions of a hydrate fractionation installation. This is accomplished by reintroducing fresh or purified water into the lower portions of a region of the fraction column where a mixture of fresh or purified water, hydrate, and gaseous hydrate-forming substance exists. (In other words, the reintroduction location is above or “after” the level where the hydrate remains stable, since it is dissociation of the hydrate that provides the fresh or purified water and (at least some of) the gaseous hydrate-forming substance into the mixture.) The difference in densities between the mixture in the fractionation column and the fresh or purified water in the conduit through which it is reintroduced into the fractionation column sets up or establishes the circulatory system, and the circulation of fluids advantageously enhances the rate at which hydrate rises within the fractionation column, as explained in the application. The amendments to claim 1 are intended to clarify these features of the invention.

Walton, in contrast, sets up no such rise rate-enhancing circulatory system. Rather, all Walton does is wash the hydrate crystals. See, for example, column 3, lines 32: "A clean wash water is introduced continuously into the upper portion of the washing chamber 18 by conduit 33 to travel downwardly through the rising clathrate crystals." Notably, in Walton, the wash water is not injected into the system in a region where a mixture of fresh or purified water, hydrate, and gaseous hydrate-forming substance exists. Rather, in Walton, the clathrate remains stable until it is melted in the separating chamber 25 by coil 26, after the wash water has been introduced. See, for example, column 3, lines 69-72: "The washed clathrate crystals are heated in the separating chamber 25 by the coil 26. The water crystals convert to liquid water and the propane crystals convert to propane gas."¹ Moreover, in Walton, introducing the wash water retards the upward migration of clathrate. See, for example, column 3, lines 39-42: "The flow rate of the wash water downwardly through the washing chamber is adjusted to retard the countercurrent upward flow of clathrate crystals[.]" Thus, the Walton system actually has a result that is exactly opposite from the result achieved with Applicants' method, and Walton fails to establish a density differential-driven circulatory system of fluid automatically rising at an enhanced rate, as recited in the claims.

In view of the foregoing, Applicants submit that all remaining claims are in condition for allowance, and timely Notice to that effect is respectfully requested.

Respectfully Submitted,


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¹ This is technically inaccurate. The clathrate crystals release both water and propane upon melting; there should not be separate water crystals and propane crystals.